Concurrent Session (i): Sequence Ready Maps

An *EcoRI* Restriction Map of Human Chromosome 19

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High resolution physical maps of human chromosomes provide the ordered reagents required for detailed analyses of gene organization and furnish the templates for determining the complete DNA sequence. We have developed a cosmid-based physical map that spans approximately 95% of the euchromatin of chromosome 19 and that includes complete digest *EcoRI* maps spanning 48 Mb (~87%) of the region. The order of a majority of the *EcoRI* fragments within a cosmid can generally be inferred from the depth of coverage (average 4.9X) of overlapping cosmids, giving an average map resolution of 10 kb or less. A total of 48 BAC, PAC, and P1 clones have also been incorporated into the maps. Twenty-nine of these larger insert clones span gaps not covered by cosmids, where the average cosmid gap is 22 kb. The present *EcoRI* mapped region consists of 326 contigs with an average size of 148 kb (range 40-1450 kb). The map includes 59 restriction mapped contigs greater than 200 kb (average size 390 kb), of which four are greater than 1 Mb. Selected cosmids from most of the restriction maps have been ordered along the chromosome, and the distance between them determined, by high resolution pronuclear FISH. Additional restriction mapped contigs have been localized through hybridization with large insert clones (YAC/BAC/PAC/P1) that serve as links between the FISH ordered clones. Thus, the position of most contigs is known. Incorporated within the overall restriction map are 251 genes, 132 expressed cDNAs, 150 genetic markers and 355 STSs (one STS/145 kb average). This approach has enabled the generation of a verified minimum tiling path of cosmids covering greater than 80% of chromosome 19. The set of ordered restriction maps enables the selection of a minimal number of cosmid clones which are required to sequence the chromosome while minimizing redundant coverage. Work performed under the auspices of the US DOE by Lawrence Livermore National Laboratory under contract No. W-7405-ENG-48.